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NOTES ON GEOGRAPHIC DISTRIBUTION

First and easternmost record of *Molossops temminckii* (Burmeister, 1854) (Chiroptera: Molossidae) for the state of Paraíba, northeastern Brazil

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ABSTRACT: This study provides the easternmost record of *Molossops temminckii* (Burmeister 1854), and the first for the state of Paraíba, northeastern Brazil. These records were based on the capture of six specimens, three males and three females. The morphometric data and morphological characters were consistent with those described in the literature. This record extends the distributional range of the species approximately 470 km eastwards.

The genus *Molossops* Peters, 1866 includes two species of South America's endemic bats, *Molossops neglectus* Williams and Genoways 1980 and *Molossops temminckii* (Burmeister 1854). *Molossops temminckii* has been recorded in Argentina, Bolivia, Brazil, Colombia, Ecuador, Guyana, Paraguay, Peru, Uruguay, and Venezuela (Simmons 2005; Eger 2008). In Brazil, the species has been recorded mostly in the Cerrado (Bordignon 2006; Cunha *et al.* 2009; Cunha *et al.* 2011; Gregorin *et al.* 2011; Silva and Anacleto 2011) and Caatinga biomes (Willig 1983; Gregorin *et al.* 2008), with records in adjacent areas in the Amazonia (Pine *et al.* 1970; Nunes *et al.* 2005), Pantanal (Schaller 1983) and Atlantic Forest (Vizzoto and Taddei 1976; Reis *et al.* 1996; Falcão *et al.* 2005) (Figure 1).

In Northeastern Brazil, *M. temminckii* (Figure 2) has been recorded at only four localities in the states of Piauí (Gregorin *et al.* 2008), Bahia (Falcão *et al.* 2005), Ceará (Willig 1983) and Pernambuco (Willig 1983). The aim of this study is to report the easternmost record of *M. temminckii* and its first occurrence for the Caatinga and Atlantic Forest of Paraíba.

Three individuals of *M. temminckii* were captured in the Reserva Particular do Patrimônio Natural Fazenda Almas (07°28' S, 36°52' W), in the city of São José dos Cordeiros, located in the Cariri Occidental region of Paraíba (Barbosa *et al.* 2007). The specimens are preserved as fluid with the skull removed and deposited in the Collection of Mammals at the Federal University of Paraíba in João Pessoa, Brazil (UFPB). Two adult males (UFPB 6156; UFPB 6157) were captured in November 2009 and one adult female (UFPB 6230) in May 2010. The specimens were captured around 18:30 h in mist nets (7.0 m x 2.5 m) placed at ground level, on a wide path bordered with trees approximately six meters in height, an area of Caatinga Baixa (Mares *et al.* 1981), up to an altitude of 500 m.a.s.l. The rainfall varies between 400–800 mm per year and the temperature ranges from 26°C and 30°C (Velloso *et al.* 2002).

Three additional individuals were collected in May 2012 in the Reserva Biológica Guaribas (RBG), area 3 (06°48' S 35°04' W), in the city of Rio Tinto, on the north coast of Paraíba. Two females (UFPB 6680; UFPB 6723) and one male (UFPB 6681) adults were captured in mist nets (3.0 m x 2.5 m) placed in gaps in the canopy (15 m height). The male was caught at 17:30 h and the females at 20:20 h and 5:00 h in an area of seasonal semi-deciduous forest (Prado 2003) with an altitude of approximately 120 m.a.s.l. The average annual rainfall and temperature are 1700 mm and 24°C–26°C, respectively (Barbosa *et al.* 2011).

According to Gregorin and Taddei (2002) and Eger (2008) the genus *Molossops* is characterized externally by elongated pointed ears that are widely separated on the forehead, antitragus turned back and the second phalanx of both digits III and IV is similar to or longer than the first phalanx. Cranial and dental features (Figure 3) comprise a single pair of lower incisors, a well-developed third commissure on the last upper molar and well-developed basisphenoid pits (Gregorin and Taddei 2002; Eger 2008).

Molossops can be distinguished from *Neoplatymops* Peterson 1965 mainly by the absence of wart-like granulations on the forearm and one instead of two pairs of lower incisors. *Molossops* also can be misidentified as *Cynomops* Thomas 1920, but can easily be distinguished by the rounded ears, the upper border of nostrils with no warts, and the two pairs of lower incisors present in *Cynomops* (Gregorin and Taddei 2002; Eger 2008).

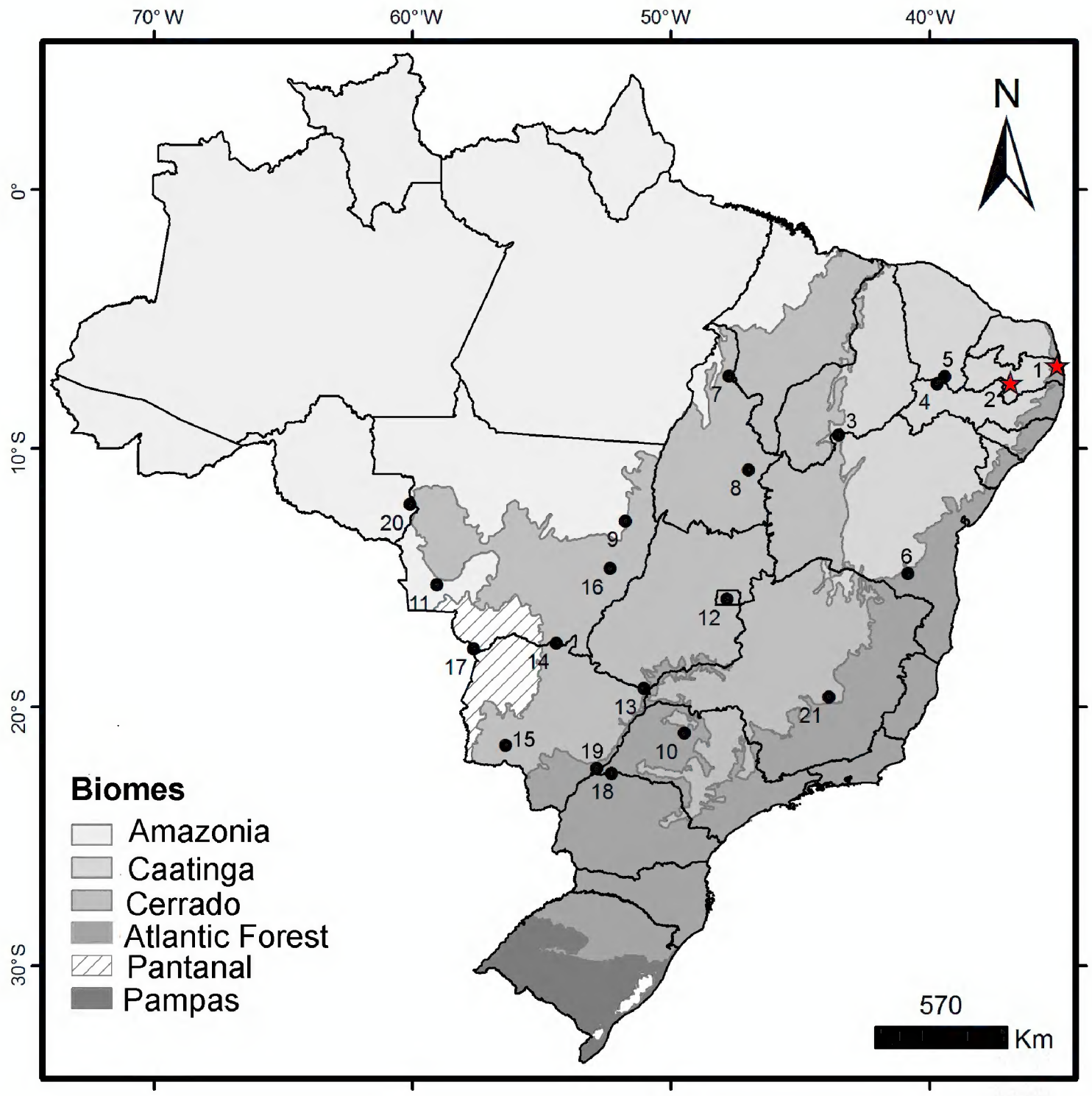

Figure 1. Distribution of the available records of *Molossops temminckii* in Brazil (star = new records; circles = existing records): (1) Reserva Biológica Guaribas, Rio Tinto, Paraíba (present study); (2) RPPN Fazenda Almas, São José dos Cordeiros, Paraíba (present study); (3) Parque Nacional da Serra das Confusões, Piauí (Gregorin *et al.* 2008); (4) Exú, Pernambuco (Willig 1983); (5) Crato, Ceará (Willig 1983); (6) Vitória da Conquista, Bahia (Falcão *et al.* 2005); (7) Babaçulândia, Tocantins (Nunes *et al.* 2005); (8) Estação Ecológica da Serra Geral do Tocantins, Tocantins (Gregorin *et al.* 2011); (9) Serra do Roncador, Mato Grosso (Pine *et al.* 1970); (10) Nova Aliancia, São Paulo (Vizotto and Taddei 1976); (11) São Domingos, Mato Grosso (Vieira 1955); (12) Distrito Federal (Bredt and Uieda 1996); (13) Complexo Aporé-Sucuriú, Mato Grosso do Sul (Bordignon 2006); (14) Sonora, Mato Grosso do Sul (Cunha *et al.* 2011); (15) RPPN Buraco das Araras, Serra da Bodoquena, Mato Grosso do Sul (Cunha *et al.* 2009); (16) Nova Xavantina, Mato Grosso (Silva and Anacleto 2011); (17) Fazenda Acurizal, Mato Grosso (Schaller 1983); (18) Parque Estadual do Morro do Diabo, Teodoro Sampaio, São Paulo (Reis *et al.* 1996); (19) Estação Ecológica do Cauiá, Paraná (Miretzki and Margarido 1999); (20) Três Buritis, Mato Grosso (Allen 1916); (21) Lagoa Santa, Minas Gerais (Eger 2008).

Figure 2. Live photograph of an adult male of *Molossops temminckii* (UFPB 6805) from Reserva Biológica Guaribas. Photo by José Anderson Feijó.

Molossops temminckii can be differentiated from *M. neglectus* by body and cranial measurements that are smaller in *M. temminckii* (forearm less than 33 mm; condylobasal length less than 15 mm) than in *M. neglectus* (Males: forearm 37–38.5 mm; condylobasal length 16.7–18.2 mm; Females: forearm 36–39 mm; condylobasal length 15.1–16.4 mm) (Eger 2008). The morphometric data (Table 1) and morphological characters of the specimens were consistent with those described in the literature, confirming their identification.

In Brazil this species has been recorded mostly for Caatinga and Cerrado domain, including adjacent states of Paraiba (Figure 1). Thus, the capture of *M. temminckii* in the RPPN Fazenda Almas was expected.

On the other hand, the new locality reported here for the Atlantic Forest was unexpected, due to the current distribution of its capture sites in Brazil, near the Caatinga and Cerrado (Figure 1). Thereby, our record constitutes the easternmost continental record for *M. temminckii*, extending its range in 470 km from the previous known eastern locality (Willig 1983).

Despite to be a new record, it's not a locally rare species. We caught thirteen individuals during 24 nights of fieldwork in the RBG (total effort: understory 30.240 m^2.h; canopy 25.920 m^2.h *sensu* Straube and Bianconi 2002). The reason that previous studies in Atlantic Forest areas in Paraiba, or even in RBG, never had recorded *M. temminckii* (Feijó and Langguth 2011) is, probably, the use of mist-nets arranged only in understory. The capture of this molossid bat in this area was only possible by the use of mist-nets placed in the canopy (15 m).

Figure 3. Dorsal, ventral, and lateral views of the skull and also lateral view of the mandible of *Molossops temminckii* (UFPB 6681).

Table 1. Body and cranial measurements (in grams [Body mass] and millimeters) of the specimens of *Molossops temminckii* collected in Paraíba, Brazil.

MEASUREMENTS	MEAN ± SD, RANGE (N)	
	FEMALES (UFPB 6230; 6680; 6723)	MALES (UFPB 6156; 6157; 6681)
Body mass	6.83±1.04, 6.0–8.0 (3)	7.67±0.58, 7.0–8.0 (3)
Total length	77.33±5.77, 74.0–84.0 (3)	74.00±2.00, 72.0–76.0 (3)
Body length	53.67±4.73, 50.0–59.0 (3)	51.67±1.53, 50.0–53.0 (3)
Tail length	23.67±1.53, 22.0–25.0 (3)	22.33±3.21, 20.0–26.0 (3)
Hind foot length	6.40±0.66, 5.7–7.0 (3)	4.93±0.95, 4.2–6.0 (3)
Ear length	13.50±0.87, 12.5–14.0 (3)	11.80±0.35, 11.4–12.0 (3)
Forearm length	32.00±1.18, 31.0–33.3 (3)	31.37±0.25, 31.1–31.6 (3)
Maximum length of skull	13.47±0.25, 13.2–13.7 (3)	13.73±0.42, 13.4–14.2 (3)
Condylobasal length	13.07±0.31, 12.8–13.4 (3)	13.23±0.55, 12.7–13.8 (3)
Mastoidal breadth	8.67±0.4, 8.3–9.1 (3)	8.37±0.6, 7.8-9.0 (3)
Zygomatic breadth	9.3 (1)	9.37±0.25, 9.1–9.6 (3)
Breadth of braincase	7.03±0.2, 6.8–7.3 (3)	7.37±0.15, 7.2–7.5 (3)
Postorbital constriction	3.70±0.17, 3.6–3.9 (3)	3.90±0.1, 3.8–4.0 (3)
Palate length	6.13±0.12, 6.0–6.2 (3)	6.50±0.17, 6.4–6.7 (3)
Palate breadth	3.30±0.26, 3.1–3.6 (3)	3.67±0.06, 3.6–3.7 (3)
Breadth across upper canine	3.43±0.06, 3.4–3.5 (3)	3.53±0.42, 3.2–4.0 (3)
Breadth across upper molars	6.50±0.17, 6.4–6.7 (3)	6.73±0.58, 6.4–7.4 (3)
Length of maxillary toothrow	5.23±0.23, 5.1–5.5 (3)	5.43±0.4, 5.2–5.9 (3)
Length of mandible	10.13±0.25, 9.9–10.4 (3)	10.60±0.5, 10.1–11.1 (3)
Coronoid process height	2.17±0.32, 1.8–2.4 (3)	2.47±0.21, 2.3–2.7 (3)

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